

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

1. (Twice Amended) A method for performing cell-based operations capable of identifying single cell status, employing a microfluidic device having (i) a reservoir containing cells for said cell-based operations, said reservoir containing an appropriate viable cell supporting medium, (ii) a first capillary channel in fluid transfer relationship with said reservoir, (iii) an electroosmotic pump comprising a second capillary channel in fluid receiving relationship with said first channel, (iv) an electrokinetic medium in said second capillary channel and (v) a pair of electrodes for creating an electrical field in said electrokinetic medium for moving electrokinetic medium in said second channel, and (vi) a detector, said method comprising:

at least prior to adding said cells to said reservoir, contacting said cells with a compound of interest[an agent] that affects the status of said cells;

contacting said cells with a labeled ligand which competes with the compound of interest for binding to a cell receptor;

applying an electrical field to said electrokinetic medium in said second capillary channel in a direction to remove liquid from said first channel, whereby cells move from said reservoir into said first channel;

continuing removal of liquid from said first channel while moving said cells to the site of said detector; and

determining the effect of said agent on the status of said cells by measuring the amount of labeled ligand bound to said cells.

7. (Twice Amended) A method for performing cell-based operations identifying single cell status, employing a microfluidic device having a reservoir containing cells for said cell-based operations, said reservoir containing an appropriate viable cell supporting medium, a first capillary channel in fluid transfer relationship with said reservoir, an electroosmotic pump comprising a second capillary channel in fluid receiving relationship with said first channel, an electrokinetic medium in said second capillary channel and a pair

of electrodes for creating an electrical field in said electrokinetic medium for moving electrokinetic medium in said second channel, and a detector, said method comprising:

adding a labeled ligand by electrokinetic means into said first capillary channel to contact said cells, wherein said labeled ligand binds to a cell surface receptor of said cells;

applying an electrical field to said electrokinetic medium in said second capillary channel in a direction to remove liquid from said first channel, whereby cells move individually from said reservoir into said first channel;

adding by electrokinetic means into said first channel a compound of interest for contact in said first channel with said cells;

moving said cells to the site of said detector; and

determining the effect of said compound on the status of said cells by detecting the presence of said labeled ligand.